

MN Canola Production Center

Research Results - 2014



UNIVERSITY OF MINNESOTA

Research Team - CPC

- **Project lead (PI): Dr. Nancy Ehlke, U of MN, St. Paul**
- **Site Agronomists: Donn Vellekson & Dave Grafstrom**
- **Interns - Ben Grafstrom, Shelia Johnson & Will Hulst**
- **CPC Partners:**
 - ❖ **MN Canola Council**
 - ❖ **MN Turf Council**
 - ❖ **U of MN**
 - ❖ **NDSU**
 - ❖ **Canola Industry Partners**
 - ❖ **Magnusson Farms - Small Plot Trials**
 - ❖ **Hugh Hunt - Large Plot Trial**



Magnusson Research Farm

U of MN Facility

- 40 acre site, located 6 miles NW of Roseau
- Small plot research on wide variety of crops
- Biomass crops, canola, corn, grass seed crops, small grains, soybeans
- Small plot research and large on-farm sites

Aerial View



New Partnership in 2014

- **MN Canola Council**
- **MN Turf Council**

- **Three year crop rotation trial with grant funding from the MDA**



CPC Research Trials in 2014

- **Small plot variety trial**
- **Small plot fertility trial**
- **Small plot fungicide trial**
- **Aster leafhopper monitoring project**
- **Three year canola rotation trial**
- **Large on-farm swath vs. direct harvest**



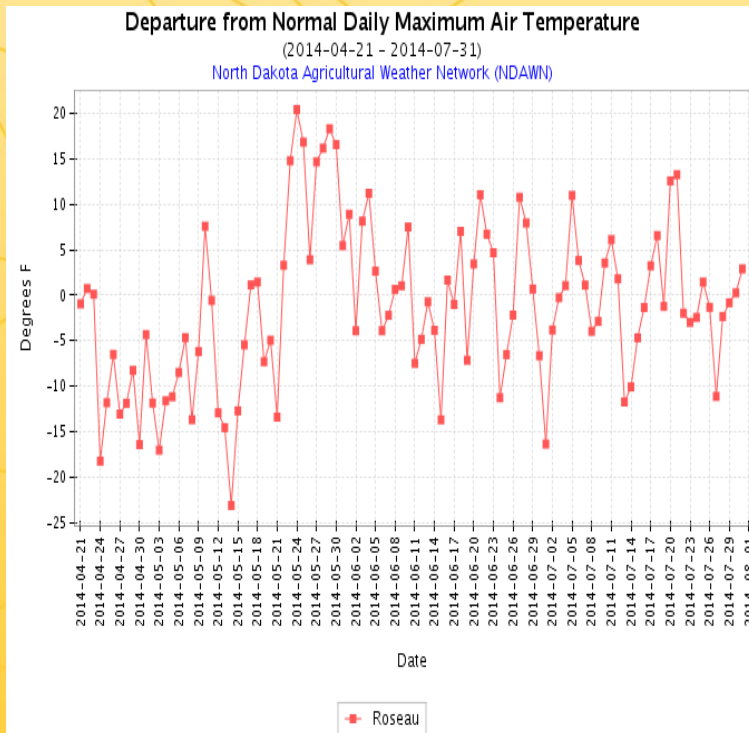
Canola CPC: Activities in 2014

- **Small plot trials planted May 29**
- **On-farm trials planted mid-late May**
- **CPC Field Day - July 16**
- **First canola swathed August 30**
- **Final harvest date September 18**

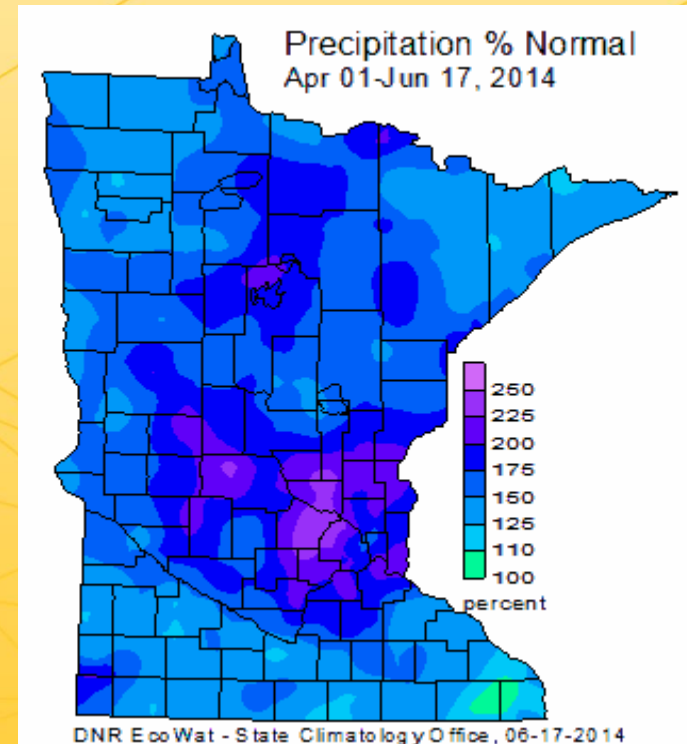


2014 - Cool and Wet

Temperatures

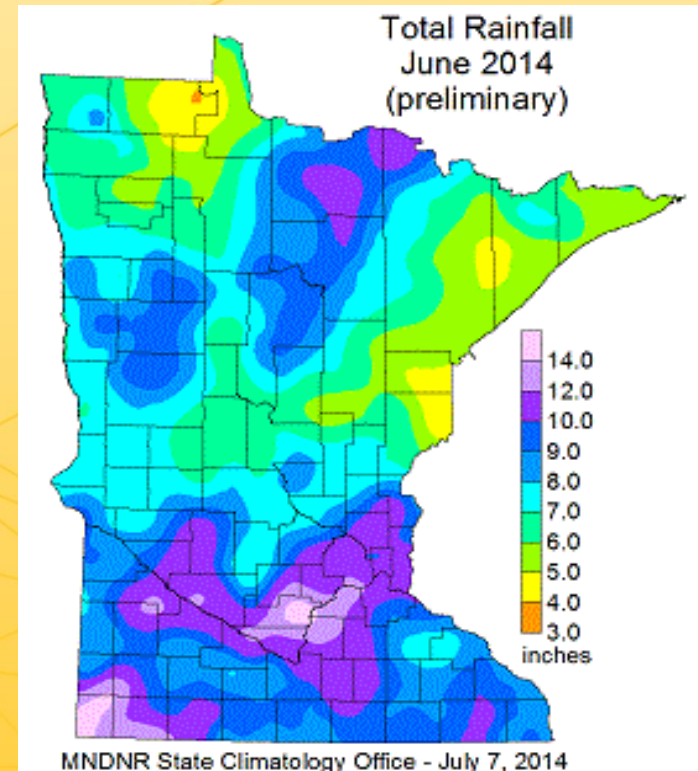


Moisture



2014 Growing Season - Recap

- **Cool temps - late start**
- **Wet spring**
- **PP acres - Kittson 5%, Roseau 21%**
- **Flea beetles**
- **CPC canola yields above average**
- **Production fields variable stands**



Small Plot Canola Variety Trial

- Planted May 29
- RCB w/4 replications
- 28 canola varieties
- 21 RR, 3 LL & 4 CL
- Harvested 9/17 & 18
- Yields ranged from 2,094 to 3,483 #/A
- Above average yields



Small-Plot Variety Trial

- **28 entries**
 - 21 Roundup Ready®
 - 4 Clearfield®
 - 3 Liberty Link®
- **9 companies**
 - Bayer
 - Brett Young
 - DuPont Pioneer
 - Mycogen
 - Monsanto
 - Proseed
 - Star Specialty Seeds
 - Winfield Solutions
 - Wilbur-Ellis



Top Three Canola Varieties

Yield (#/acre)

- InVigor L130 3483
- InVigor L252 3229
- DKL38-48 3120

- Trial Mean 2,694

Oil (%)

- HyClass 930 45.1
- Star 402 44.5
- DK30-03 43.8

- Trial Mean 41.6



Summary Small-Plot Canola Variety Trial

- Trial average yield = 2,694 #/acre
- Trial range in yield: 2,094 - 3,483 #/acre
- Above average yields @ CPC in 2014
- Limited disease and insect pressure
- Depending upon management practices canola growers have excellent choices in LL, CL and RR canola varieties adapted to this area



Canola Fertility

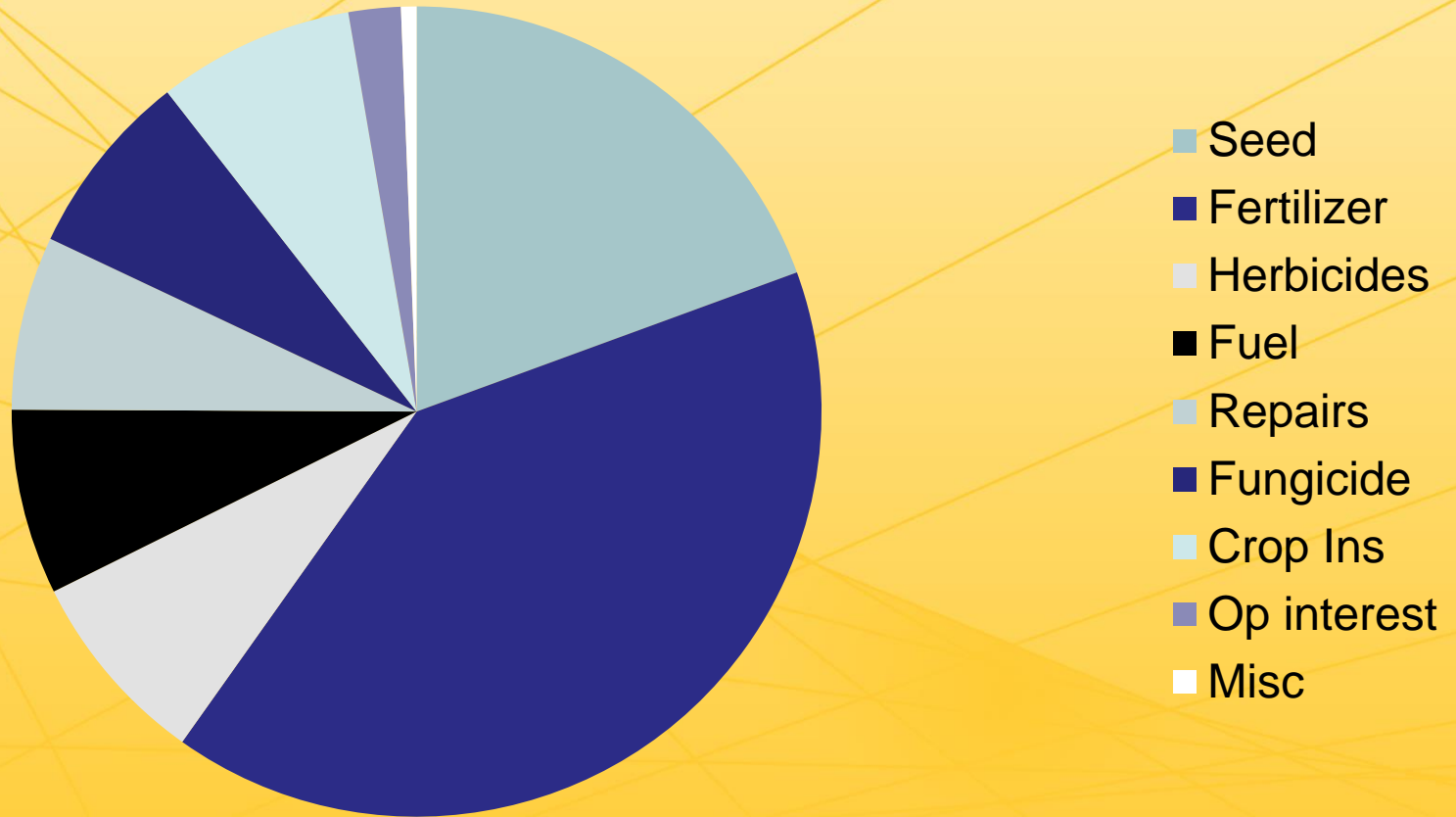
WHAT WE KNOW



Canola Direct Costs (\$242/acre)

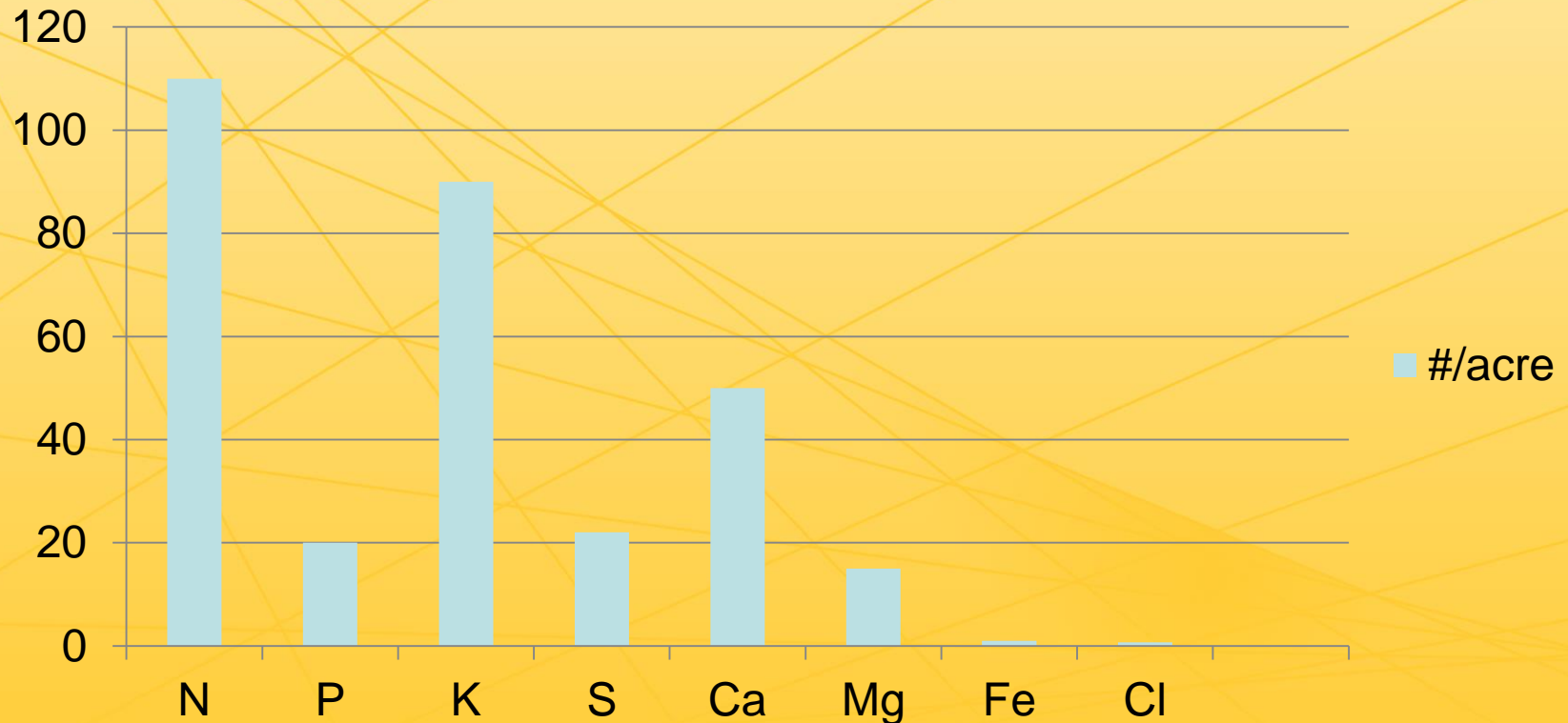
Source: NDSU Crop Budget

\$/acre



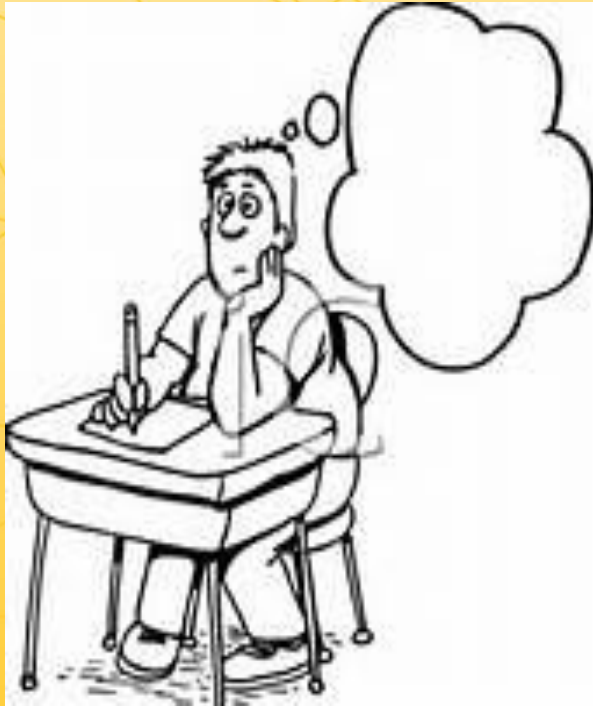
Nutrient Content (#/acre) in 35 (bu/acre) Canola Crop

Nutrient Content



Can We Improve Nutrient Efficiency?

Canola Fertility



Strategies

- Protect nitrogen with coated urea e.g. ESN
- Combination of PPI and post applied urea
- Delay nitrogen application 4-6 If canola
- Post applied urea with Agrotain N stabilizer
- Variable rate (VRT)



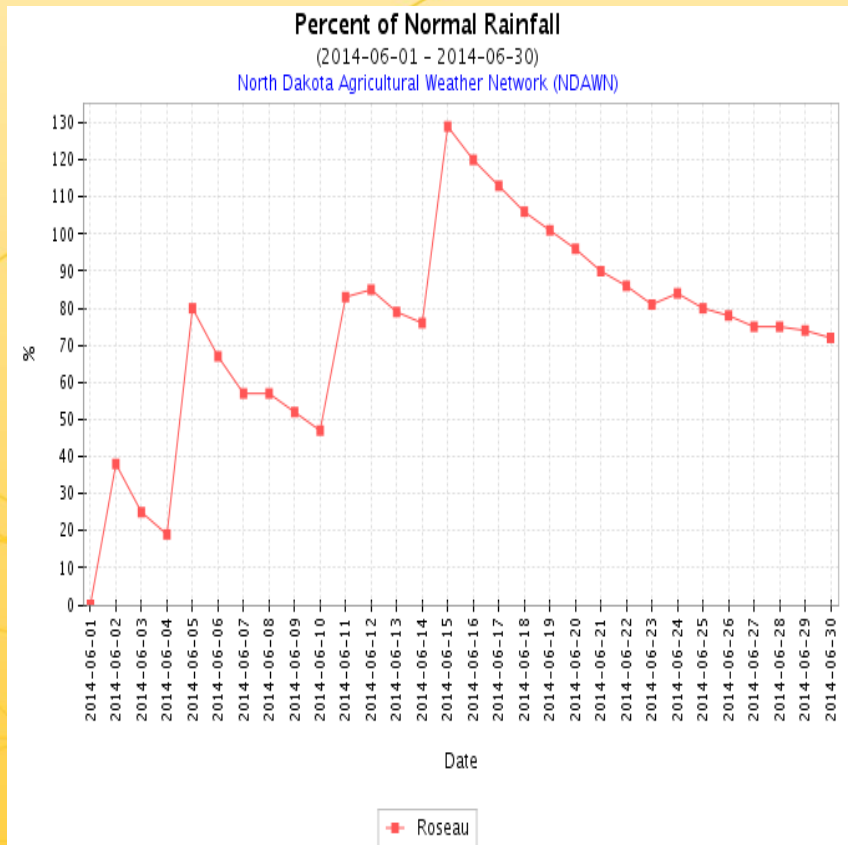
Small Plot Fertility Trial

- Previous crop - wheat
- Planting date: May 29
- RDB w/4 reps
- Background nitrogen
- 0-6 = 6#; 6-24 = 7#
- Post fertility applied June, 23 (3-5 lf canola)
- Light meter
- UAV



Canola Fertility Trial

- Canola variety Star 514
- Seeding date: May 29
- Post fertilizer applied June 23 to 3 to 5 lb canola
- 0.5 inch rain after post fertilizer treatments applied
- Canola yields ranged from 2,173 to 3,560 #/A



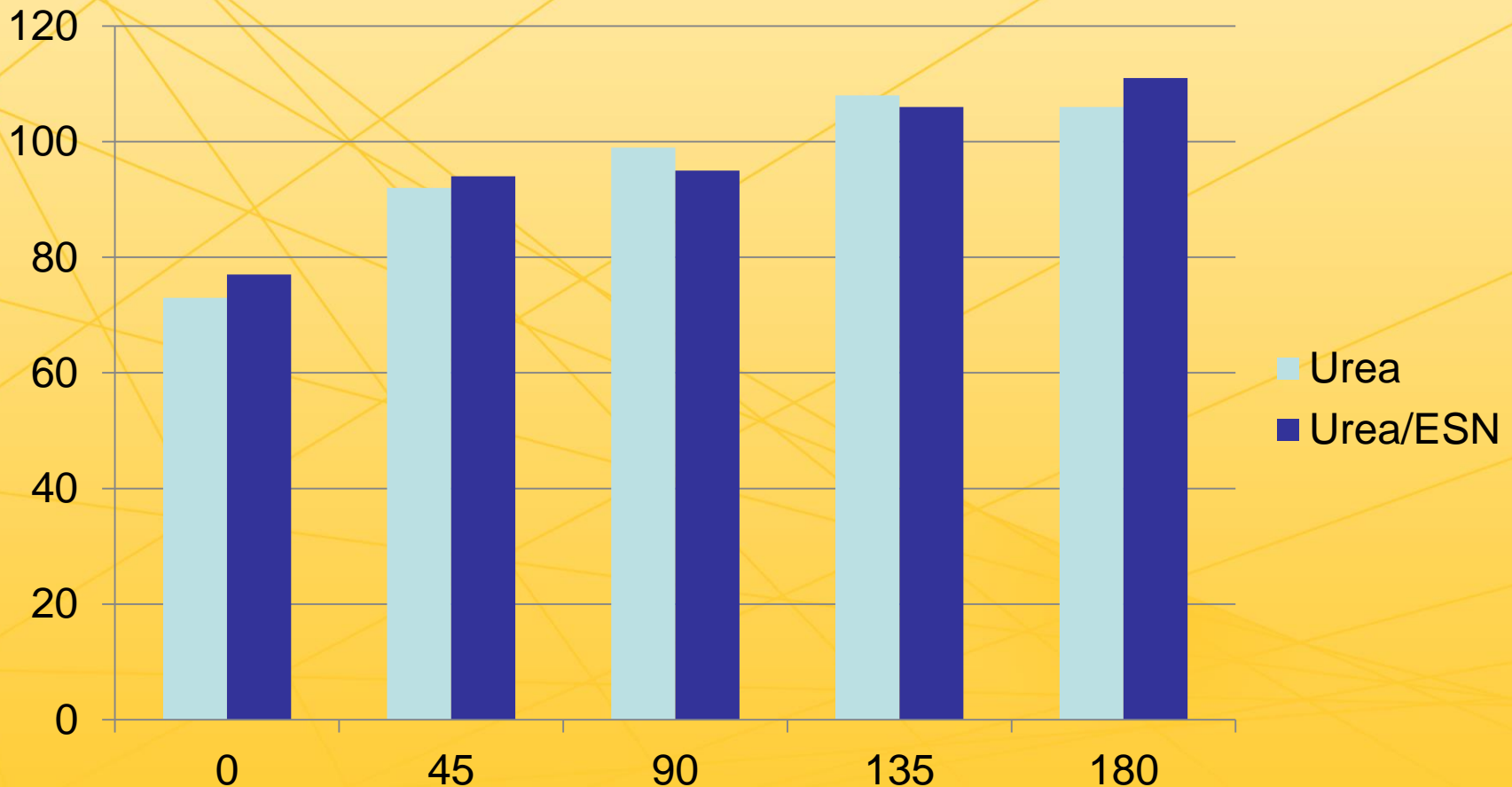
Small Plot Fertility Treatments

- Urea PPI - 0, 45, 90, 135, 180
- Urea + ESN - 0, 45, 90, 135, 180
- Urea PPI + Post - 45+45, 45+90, 45+135
- Urea PPI + Post w/Agrotain Ultra
 - 45+45, 45+90, 45+135
- Urea Post - 0, 45, 90, 135
- Urea Post + Agrotain Ultra - 45, 90, 135
- Post treatments applied June, 23



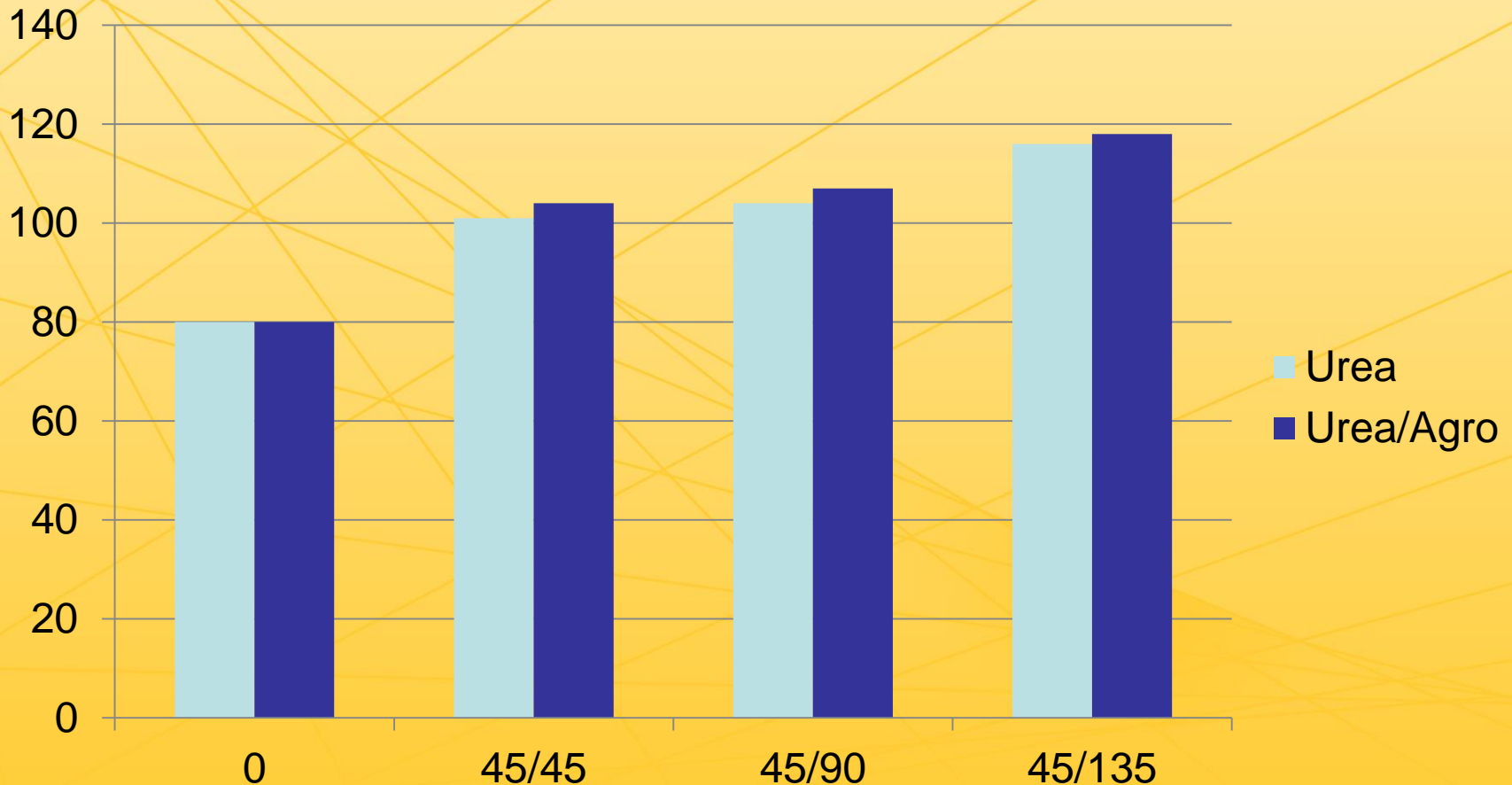
Canola Yield (% of Mean)

Mean Yield = 3,007 #/acre



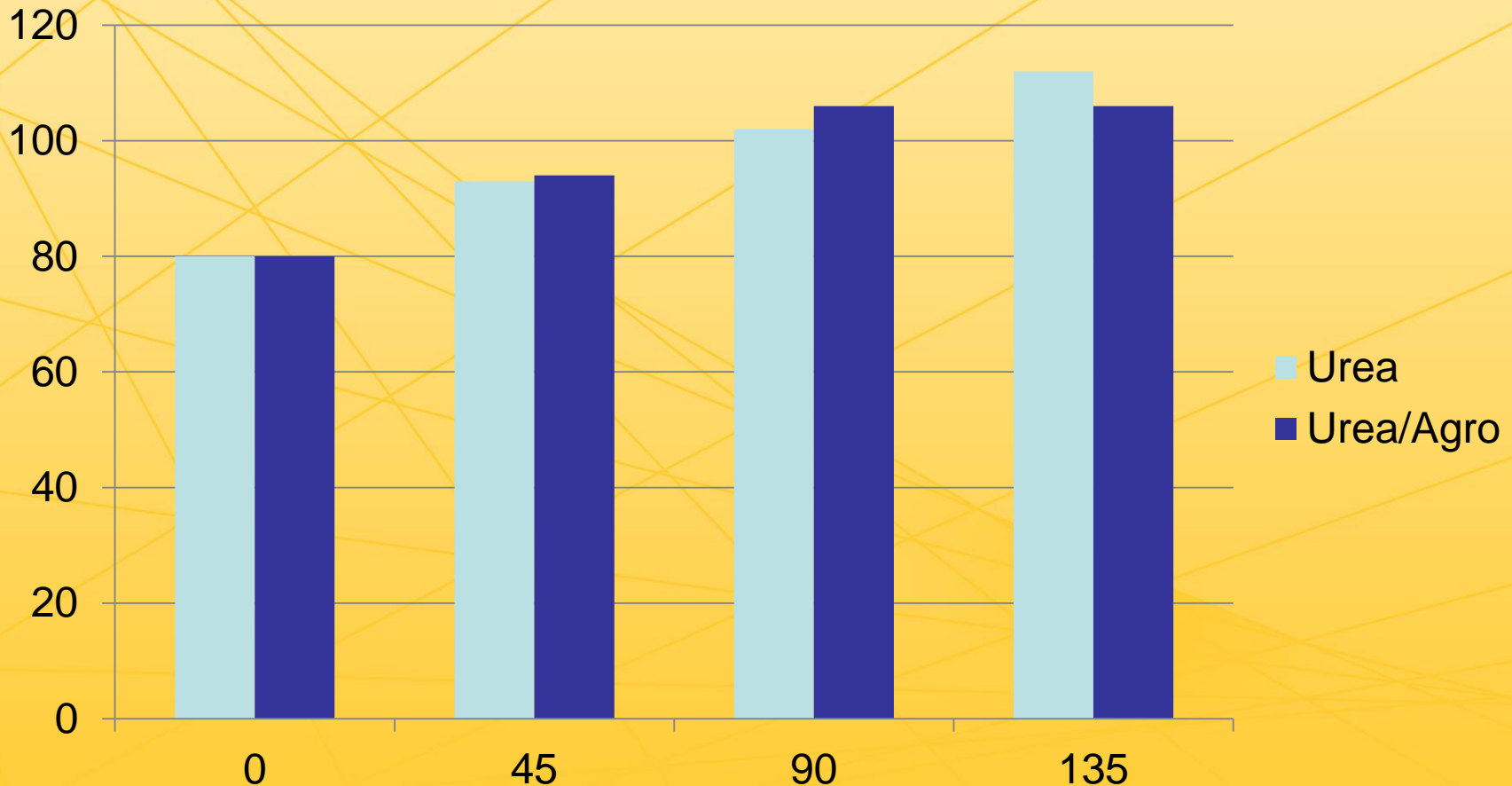
Canola Yield (% of Mean)

Mean Yield = 3,007 #/acre



Canola Yield (% of Mean)

Mean Yield = 3,007 #/acre



Methods of Application to Achieve Canola Yields of >100% Mean

- Mean yield = 3007 #/acre
 - » Pounds nitrogen/acre
- PPI 135
- PPI + Post 45 + 45
- Post only 90
- Best Yields in 2014 - 45 PPI + 135 Post
 - 3,488# from Urea
 - 3,560# from Urea + Agrotain



Canola Yields at the 95% Confidence Level

- **Trial Mean = 3007#/acre**
- **Highest yield in trial 3,560#/acre**
 - **Urea @ 45# PPI + Urea +Agrotain Post @135#**
- **Second highest yield in trial 3,488#/acre**
 - **Urea @ 45# PPI + Urea Post @ 135#**



How to Detect the Amount of Nitrogen Availability to Plants?

- **Estimate based on moisture and temperature**
- **Soil tests**
- **Tissue tests**
- **Visual observation**
- **Guess??**
- **Crop sensors (chlorophyll, proteins, AA)**
- **All have advantages and disadvantages**

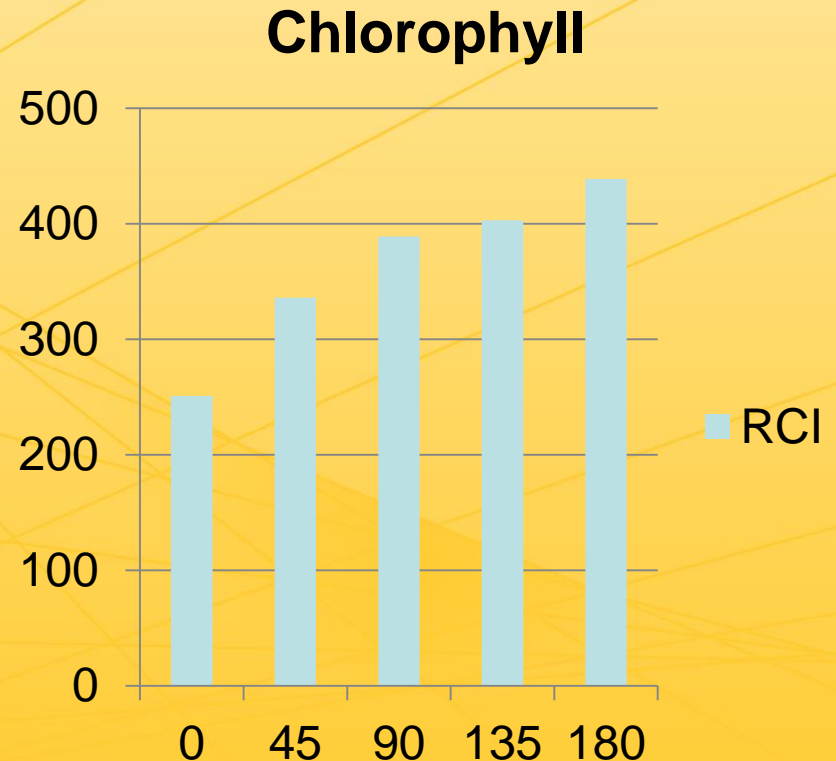


Photosynthetically Active Radiation (PAR) – 2013 Data

Chlorophyll Meter



RCI Meter Readings



Canola Fertility Summary

- **No 'Silver Bullet'**
- **Treatments that improve N efficiency**
 - Urea PPI with ESN
 - Urea PPI followed by Urea post
 - Urea with Agrotain applied post
- **Majority of nitrogen uptake 4-lf to bloom**
- **Light meter and UAV as a diagnostic tool??**



Large On-Farm Canola Trial: Swath vs Direct Harvest

- ❖ Trial was planted at Hugh Hunts- Hallock
- ❖ Trial abandoned as wet field conditions caused extreme field variability in canola stand
- ❖ Will repeat 2013 trial 2015
- ❖ direct cut, direct cut with desiccant, swath



Two Factors Conducive for Direct Harvest Canola

Uniform Canola Stand



“Tabled” Canola



Direct Harvest Canola

Uniform Canola Stand



Note Reel Height

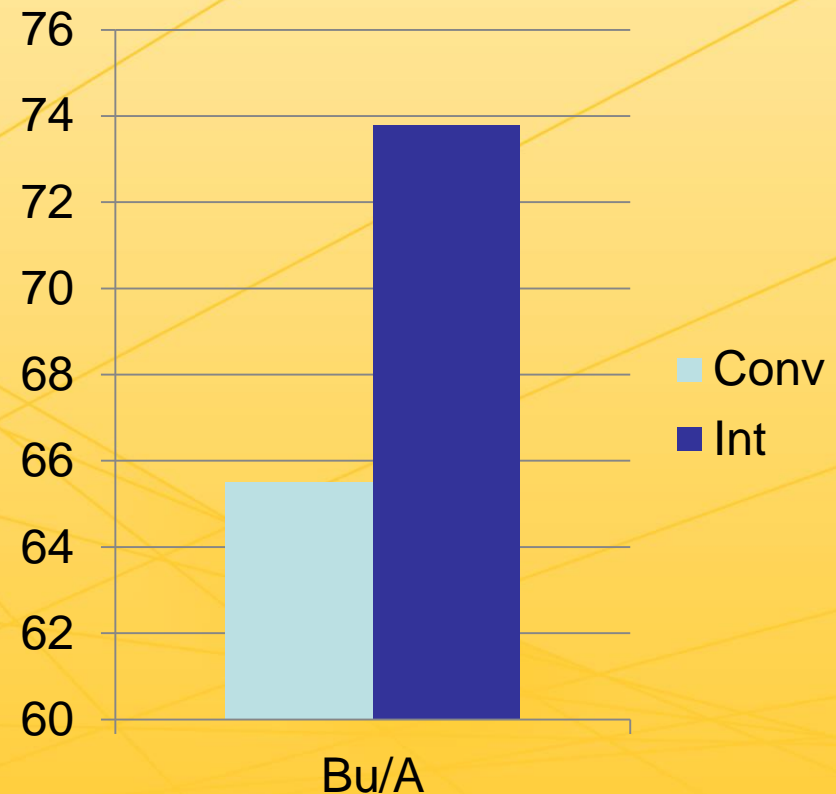


Do Crops Respond to Multiple Fungicide Applications?

Wheat and Ryegrass

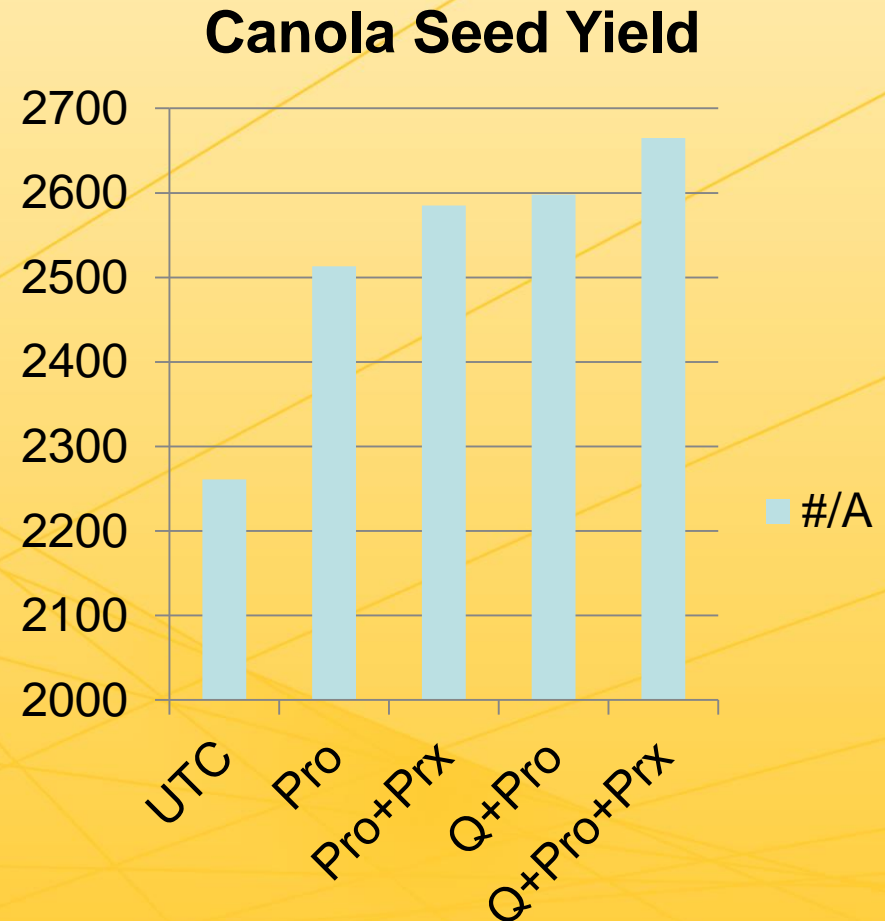
- **MN Variety Trials published in Jan 2013**
- **8.3 bu/a advantage with intensive fungicide treatments compared to conventional**
- **Mnturfseed.org: ryegrass seed yield advantage of over 200 pounds/acre**

Wheat Data – U of MN



Small Plot Fungicide Trial MN CPC in 2013

- Trial located at CPC
- RCB w/4 reps
- UTC = Untreated
- Pro = Proline 5 oz/A applied @ 30% bloom
- Prx = Priaxor 6.0 oz/A applied @ 80% bloom
- Q = Quadris 7 oz/A applied at 2 to 4 lf



2014 Fungicide Results

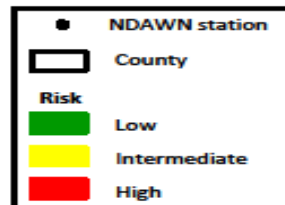
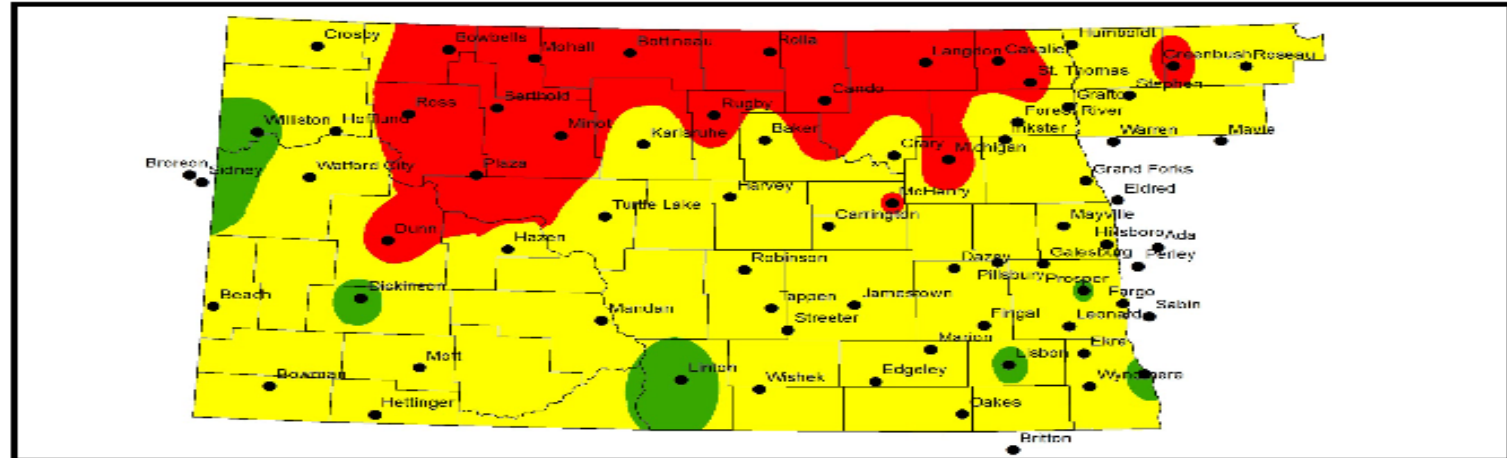
- **No difference in fungicide timing or product**
- **A trend for more canola yield with Priaxor**
- **Mean yield for trial = 3,265 #/acre**
- **Untreated control = 3,242 #/acre**

- **Repeat trial next year**



NDAWN – July 6, 2014

Estimated risk of Sclerotinia stem rot development for canola July 6, 2014



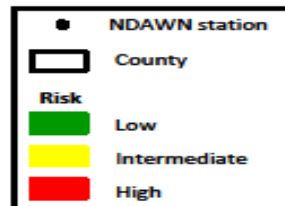
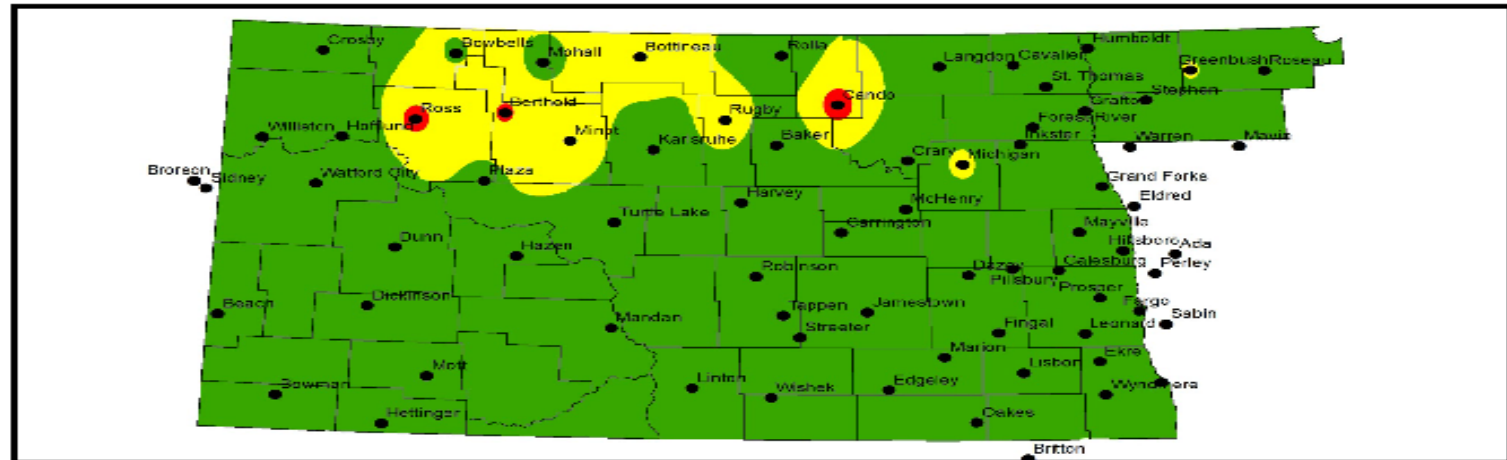
Sclerotinia Risk

Estimation of the risk of Sclerotinia stem rot development is based on temperature and precipitation patterns prevalent in the region as recorded by NDAWN Stations and only apply to fields where canola is in the flowering period. Red areas indicate conditions are favorable for infection; if apothecia are present in these fields fungicide applications may be warranted. Fields in yellow areas should be scouted for apothecia and changing weather conditions. Fields in green areas have low risk of disease development



NDAWN – July 12, 2014

Estimated risk of Sclerotinia stem rot development for canola July 12, 2014



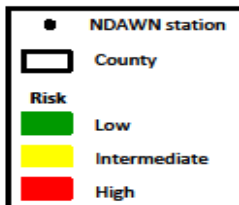
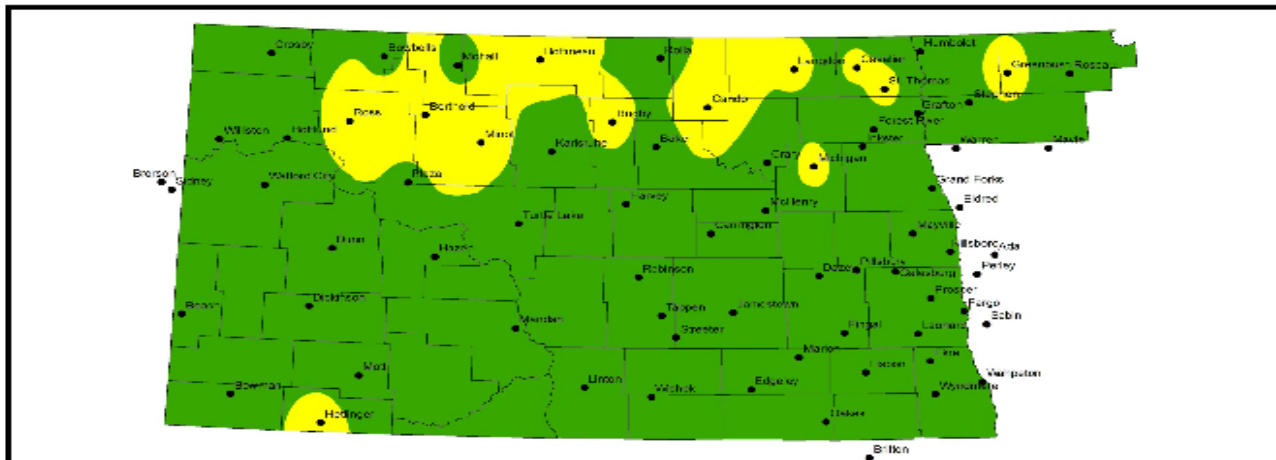
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NDAWN – July 18, 2014

Estimated risk of Sclerotinia stem rot development for canola July 18, 2014



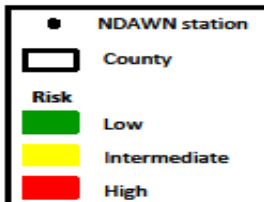
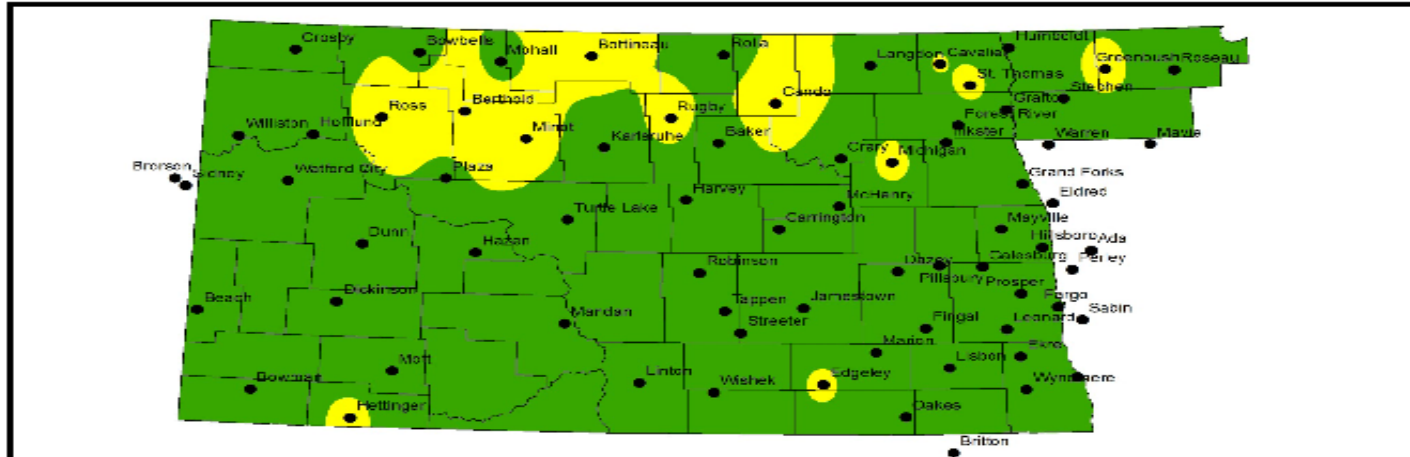
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NDAWN – July 21, 2014

Estimated risk of Sclerotinia stem rot development for canola July 21, 2014



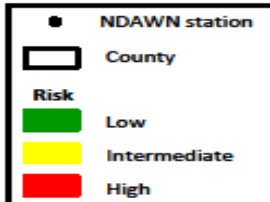
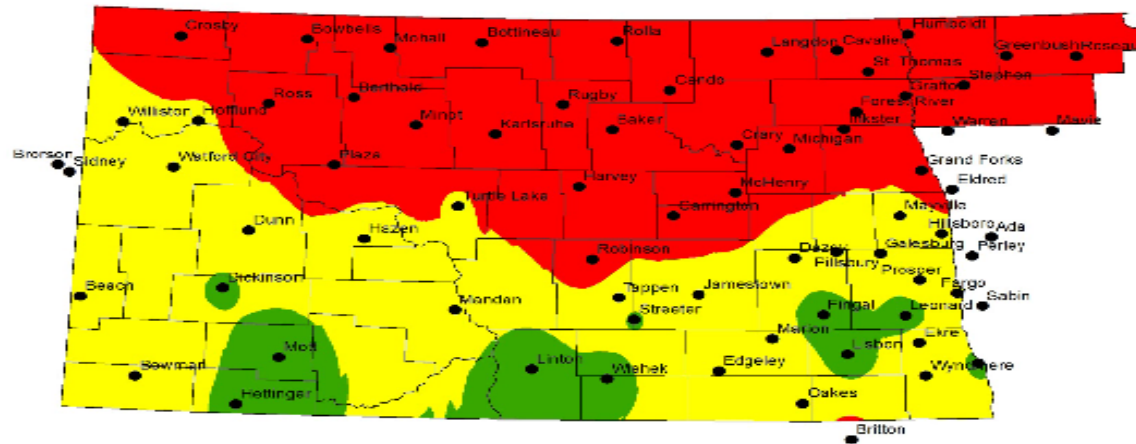
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NDAWN – July 28, 2014

Estimated risk of Sclerotinia stem rot development for canola July 28, 2014



Sclerotinia Risk

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Summary Fungicide Trials

- **Limited expression of white mold in 2014**
- **No difference in fungicide treatment or timing**
- **Evidence of positive yields from multiple fungicide application - small plot trial 2013**
- **Will repeat small plot fungicide trials in 2015**



Aster Yellows in Canola

Aster Leafhopper

- 2012 was the year of leafhopper
- In 2012, leafhoppers observed in all crops in April & May
- > 30% infection in 2012
- Normal infection rate <1%
- Leafhoppers are brought in on southerly winds
- Goal was to establish a leafhopper monitoring network

Aster Yellows



Aster Yellows in Canola - 2014



Aster Leafhopper Early Alert Project in Canola

Project Objectives

- Use National Weather Service data to predict leafhopper flights
- Coordinate leafhopper scouting network
- Determine leafhopper numbers & % infectivity
- Communicate to canola growers and industry partners

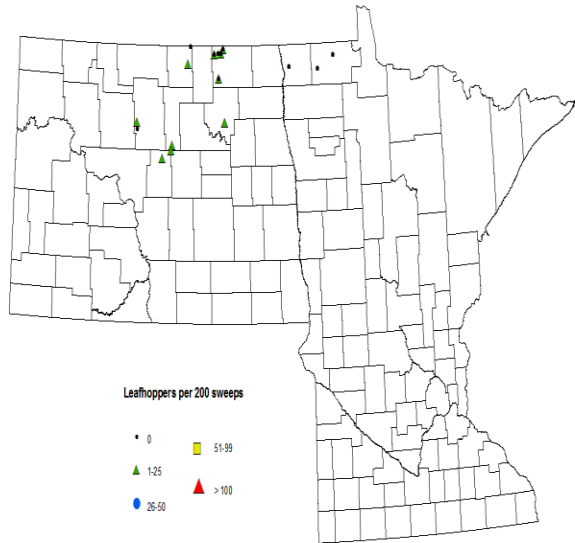
Aster Yellows



Aster Leafhopper Scouting Project in 2014

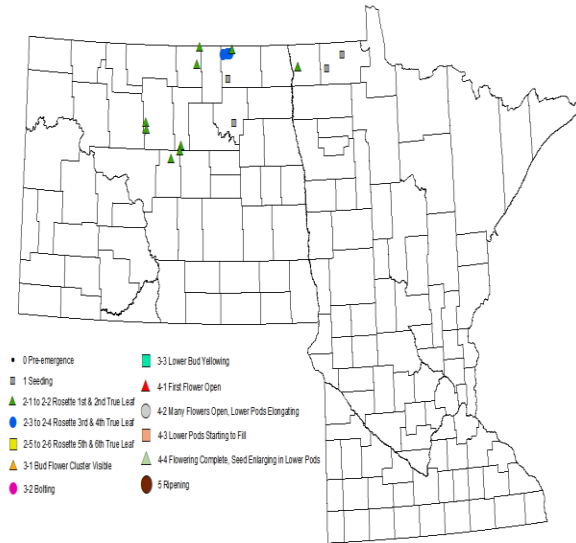
Aster Leafhoppers

June 9 - June 13, 2014



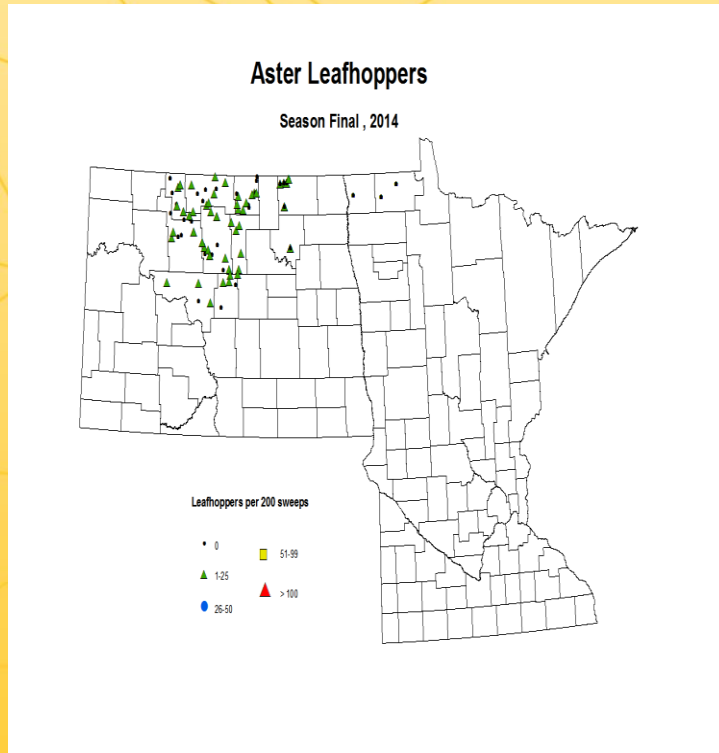
Canola Growth Stages

June 9 - June 13, 2014

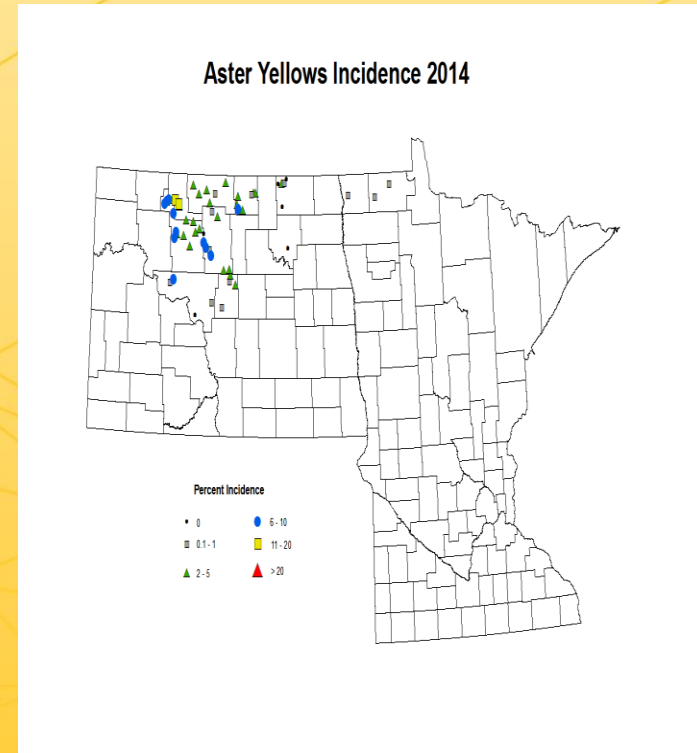


Leafhopper Numbers and Aster Yellows in 2014

Aster Leafhopper - Final



Aster Yellows - Swather



Aster Leafhopper Monitoring Project – Jan Knodel PI

Aster Leafhopper
P. Beauzay

Joint Effort ND & MN

- Objective to determine leafhopper flights into canola growing region
- Good network established in 2014
- Low leafhopper pressure in 2014
- Weekly scouting results posted in NDSU Pest Newsletter



Canola Rotation Trial

- **Brian Jenks (PI) on project**
- **Project duration three years**
- **Objective to determine canola growth development and yield in rotation with spring wheat and soybeans**
- **First year was to establish the various rotational crops**



Canola Rotation Trial

Three Year: 2013-2015

Treatment	2013	2014	2015
1	Wheat	Wheat	Soybean
2	Wheat	Canola	Soybean
3	Wheat	Wheat	Canola
4	Wheat	Soybean	Canola

Three Years: 2014-2016

Treatment	2014	2015	2016
1	Wheat	Wheat	Soybean
2	Wheat	Canola	Soybean
3	Wheat	Wheat	Canola
4	Wheat	Soybean	Canola



Canola Rotational Trial after Fall Tillage

Canola Rotation Trial



Wheat Residue



Questions



Contact Information

- www.mncanola.org
- dave.grafstrom@northlandcollege.edu
- **Dave Grafstrom**
- **Cell: 320-293-8722**



Fertilizer Prices Dec., 1, 2014

Roseau, MN

- Urea (46-0-0) \$440/ton = \$0.478/unit
- ESN (44-0-0) \$570/ton = \$0.648/unit
- Agrotain - 3 Qts/ton = \$0.06 unit of 46-0-0
- MAP (11-52-0) = \$585/ton
 - Ammonium nitrogen = \$0.37/unit
 - Phosphate = \$0.563/unit

